Vehicular Multimedia

Human Centered Technology & Standards

for an

Autonomous Entertainment Experience

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Europe Technology Standards Office
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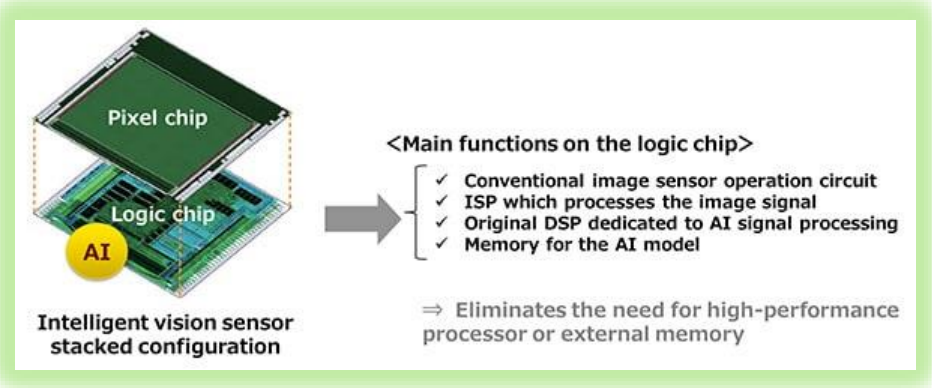
SONY MUSIC

SONY

Sony Interactive Entertainment



SONY PICTURES

Entertainment

Electronics

AI

Human Behaviour

Planet and People

Standards

- Interoperability
- Procurement
- Ecosystem

Mobility

Sustainable Life

Sustainable Work

Healthy Life

Enjoyable Entertainment

INTERNATIONAL TELECOMMUNICATION UNION

TELECOMMUNICATION STANDARDIZATION SECTOR

STUDY PERIOD 2017-2020

FGVM-I-#15

Focus Group on Vehicular Multimedia

Original: English

WG(s):	N/A	Virtual, 15-16 DEC 2021

INPUT DOCUMENT

Source:	Expert Renaud Di Francesco, Sony Europe BV
Title:	Gesture Based Control of Vehicular Multimedia
Purpose:	Discussion

Contact:	Renaud Di Francesco Sony Europe BV UK	Tel: +447795490384 Email: renaud.difrancesco@sony.com

Gesture recognition

to control

a Vehicular Multimedia system

As currently implemented by Sony Depthsensing

Issue and opportunity

Robust Gesture Recognition

Visualising gesture based operation

Time of Flight Sensors

Sony Depthsensing Solutions

From Softkinetic to Sony and to the future of Depthsensing

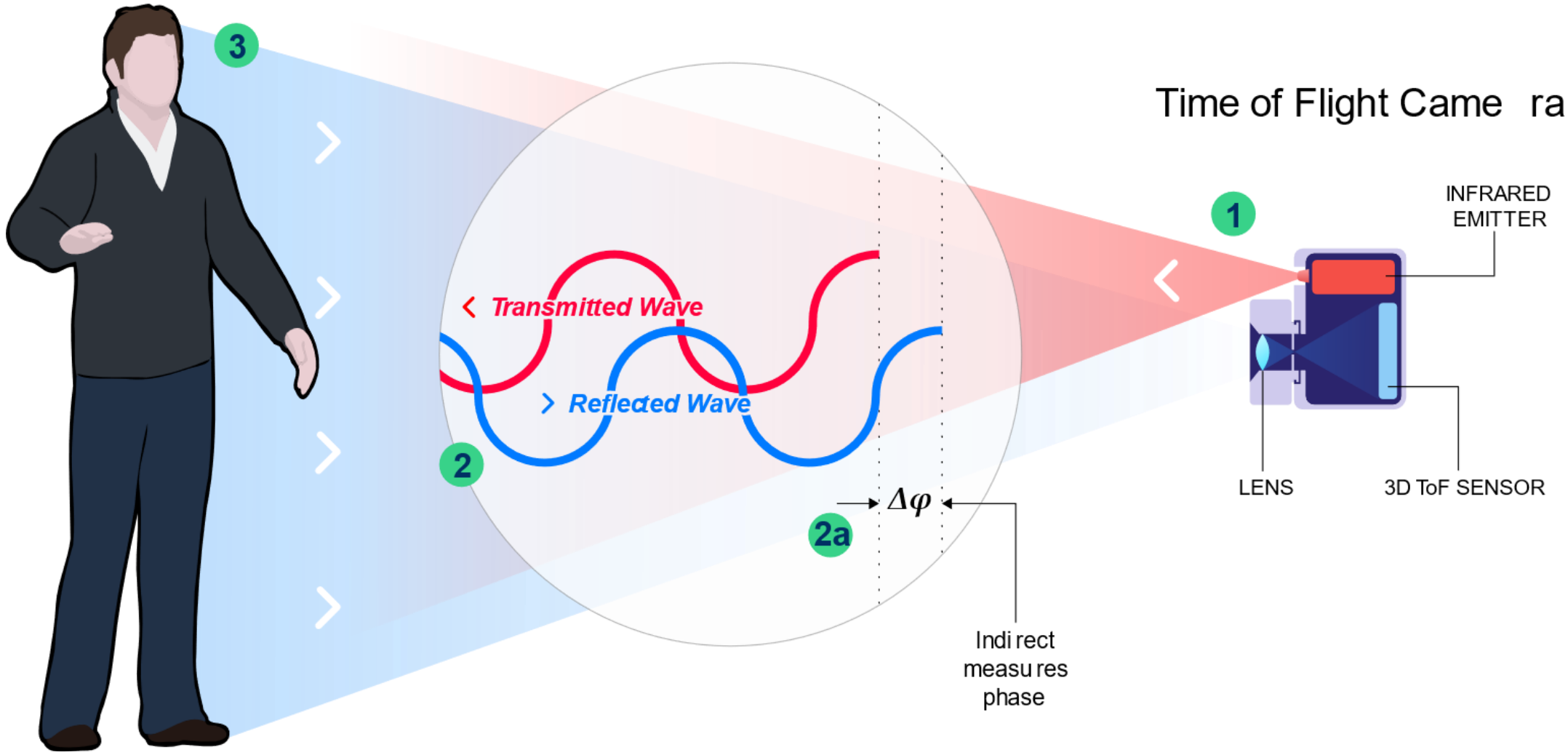
SoftKinetic → SONY

2007 2013 2015 2022






How Time of Flight (ToF) works

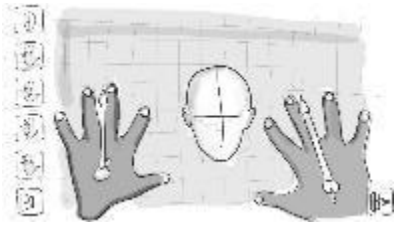


Technology Solution Stack

Enable machines to see!

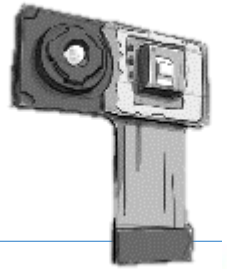
Face ID, gesture, in cabin monitoring, SLAM, AR, visual effects …

3D Image Processing Software



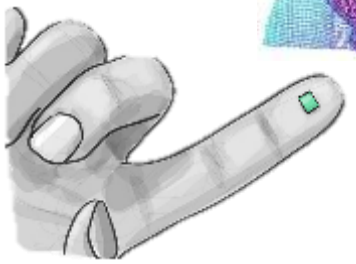
- 3D camera device driver
- 3D image filters
- 3D scene analysis
- 3D gesture recognition middleware
- Obstacle detection

3D TOF Camera System



- Optics, illumination, power
- Connectivity (USB, MIPI)
- Calibration
- Firmware

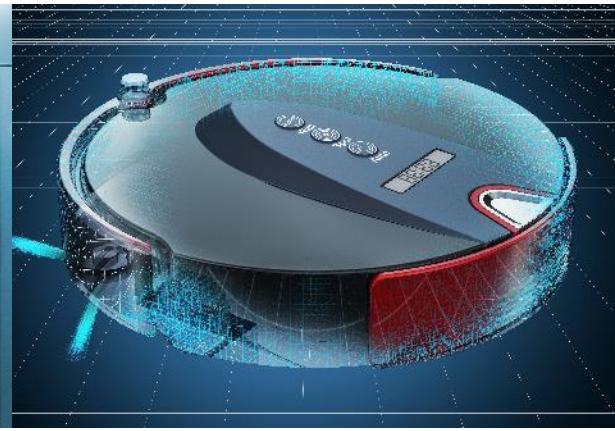
3D TOF Sensor



- Indirect time-of-flight technology
- Current Assisted Photonic Demodulator (CAPD)
- Range of optical FOV - ultra wide angle

Industries



Consumer

- Mobile phone applications
- Improved virtual effects
- Gaming
- Commerce apps

Automotive monitoring

- Gesture control
- In-cabin monitoring
- New interaction modalities

Factory Automation

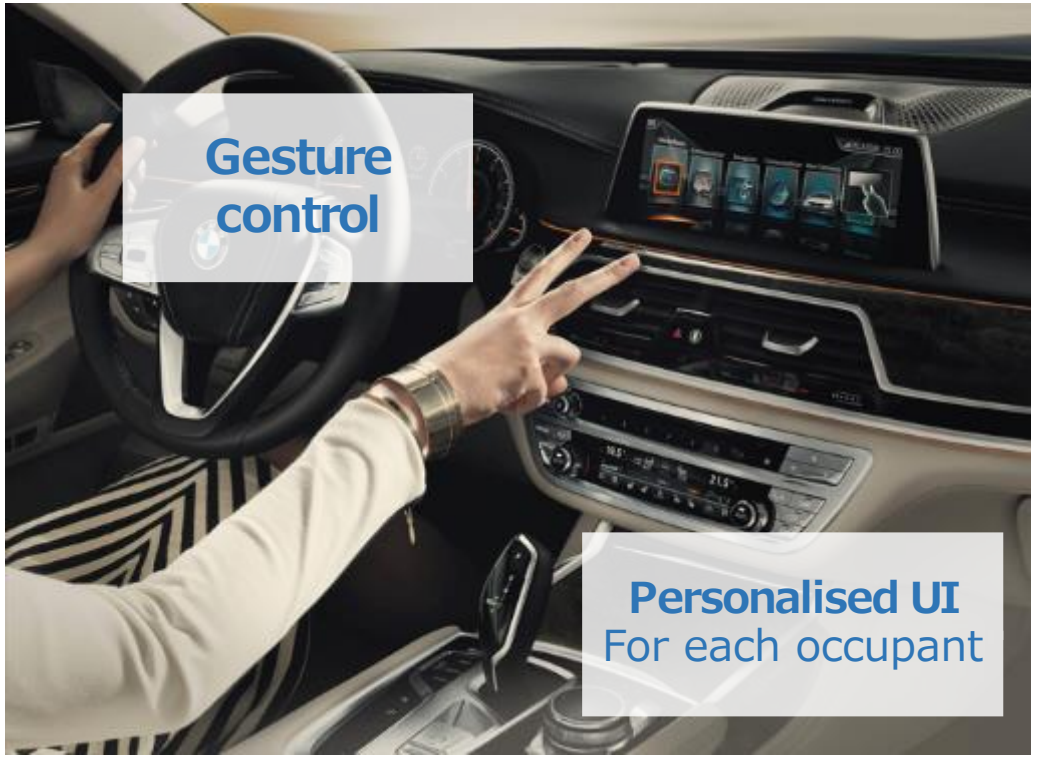
- Cobotics
- Virtual reality
- Improved training

Robotics

- Spatial awareness
- Object detection and classification
- Obstacle and cliff Detection

In-Cabin Gesture Control

CARlib



Full range of configurable gestures already developed

- Infotainment
- HVAC
- Navigation
- 3D environment

Project

HERMES

- In-cabin **experiences** of the future
- **Interaction** solutions
- **Responds** to changing levels of autonomous driving
- **Evolution** towards car as ‘THIRD PLACE’

RDC – REAR SEAT DEMO

HARDWARE :

- Window projector
- Tepui projector
- Folding table
- Window panel

Use cases

- Multi-screen display
- Touchless interaction
- Object recognition
- Transparent display
- Interactive screen
- Gamification & custom UI

On-board the Autonomous Vehicle,

Vehicular Multimedia,

the Entertainment Experience

Quote from Spiderman I:

“-With great power comes great responsibility”

Illustration 1: Keeping “Fun” fun, even on a bumpy winding road

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Source:	Expert Renaud Di Francesco, Sony Europe BV
Title:	Motion Sickness Free Vehicular Multimedia Entertainment
Purpose:	Discussion

Contact:	Renaud Di Francesco Sony Europe BV UK	Tel: +447795490384 Email: renaud.difrancesco@sony.com

Issue

Motion sickness occurs with moving vehicles

Sharp turns on a mountain road, vibrations, light rays entering a vehicle

1/3 humans highly sensitive to motion sickness

Motion sickness could be increased by sustained attention to displays

- **Attention of passenger** is focused on the entertainment/display
- **Body of the passenger moving** in sync with the vehicle and its environment
- **Disconnect between attention (voluntary) and body** under physical unescapable movement constraints

Requirements for passenger comfort

- On board a vehicle (in movement)
- During a multimedia session (VM, the theme of this FG)

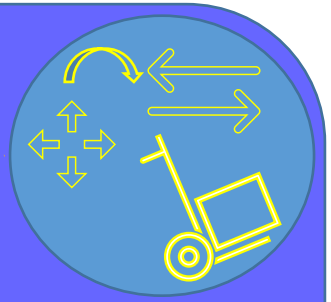
Technical approaches to

- Reduce Discomfort
- Mitigate Motion Sickness factors

Recommended Standardisation areas

Passenger comfort

with attention to



-Vehicle movement and its perception

-Visual and auditory aspects of Vehicular

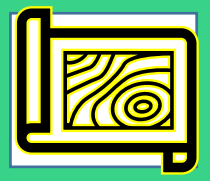
Multimedia Rendering for Entertainment

Combination of the two factors above

Technical approach to mitigate or resolve motion sickness factors

-Vehicle and route based

-Content rendering based



Motion sickness prevention

- The lesson of waltz (ballroom dance)
  - Steps tempo is 1, 2, 3
  - Couples of dancers rotate
  - Rotational motion sickness (worse than linear motion) might occur
    - To avoid it, couples segment the movement of their heads, so that at every sequence of steps 1,2,3 the eye gaze returns to looking at the same “resting” object in the room at every turn, thus giving back the dancer full control and perceived stability, removing the “spinning” motion sickness (perceptual noise).

- The rough sea journey
  - It is often advised for people subject to sea motion sickness to stay on the deck if possible and keep their eyes on a fixed far away object if available.

Shift representation from

Euler (tangent/local)

to

Lagrange (absolute/global)

Reconnect
-central inertial perception
-peripheral sensorial perception